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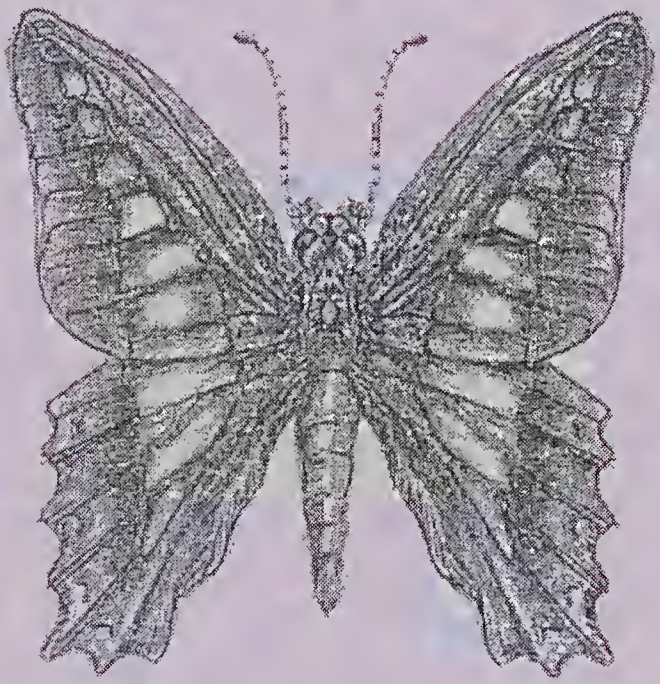

News Bulletin of The Entomological Society of Victoria Inc.

THE ENTOMOLOGICAL SOCIETY OF VICTORIA (Inc)

MEMBERSHIP

Any person with an interest in entomology shall be eligible for Ordinary membership. Members of the Society include professional, amateur and student entomologists, all of whom receive the Society's News Bulletin, the Victorian Entomologist.

OBJECTIVES

The aims of the Society are:

(a) to stimulate the scientific study and discussion of all aspects of entomology,
(b) to gather, disseminate and record knowledge of all identifiable Australian insect species,
(c) to compile a comprehensive list of all Victorian insect species,
(d) to bring together in a congenial but scientific atmosphere all persons interested in entomology.

MEETINGS

The Society's meetings are held at La Trobe University, 2nd Floor, Room 2.29, 215 Franklin Street, Melbourne (Opposite the Queen Victoria Market) Melway reference Map 2F B1 at 8 p.m. on the third Friday of even months, with the possible exception of the December meeting which may be held earlier. Lectures by guest speakers or members are a feature of many meetings at which there is ample opportunity for informal discussion between members with similar interests. Forums are also conducted by members on their own particular interest so that others may participate in discussions.

SUBSCRIPTIONS

Ordinary Member	$20.00
Country Member	$16.00 (Over 100 km from GPO Melbourne)
Student Member	$12.00
Associate Member	$ 5.00 (No News Bulletin)

No additional fee is payable for overseas posting by surface mail of the news bulletin. Associate Members, resident at the same address as, and being immediate relatives of an ordinary Member, do not automatically receive the Society's publications but in all other respects rank as ordinary Members.

Cover design by Alan Hyman.

Cover illustration of the Blue Triangle butterfly, *Graphium sarpedon* L. by Rhonda Millen.

MINUTES OF THE GENERAL MEETING, 18 FEBRUARY 2000

Present: P. Carwardine, A-H, Duale, I. Endersby, E. & P. Grey, C. Peterson, D. Stewart, J. Tinetti, G. Weeks.

Visitors: C. Barter, M. Endersby, M. Kesavan.

The President opened the meeting at 8.05 pm.

Apologies: D. Dobrosak

Minutes of the 10 December General Meeting [Vic. Ent. 30: 1-2 (1999)] were accepted (Stewart/Endersby).

Treasurer's Report.: The Treasurer presented the financial statement.

Account Balances General Account $5,679
Le Souëf Account $3,495

The Taxation Office has given verbal assurance that the Society's exemption from Income Tax will not be altered by the GST legislation.

General Business:

- Membership. Dr. L. Cookson was elected to membership and nominations have been received from J. Stoner and B. Walkley.

Speaker:

The president introduced Professor Neil Archbold from Deakin University who spoke on fossil insects. The text of Professor Archbold's talk appears on page 21. Of particular interest is the 35 million year gap in the insect fossil record during the late Devonian and Early Carboniferous. Recent work by a Deakin University student in the Mansfield Basin of Victoria has located important material from this period.

Large scale extinctions at the end of the Permian dwarf, in magnitude, the well publicised Cretaceous extinction of dinosaurs. Eight insect orders became extinct during the Permian event. Spectacular evolutionary radiation occurred during the Mesozoic and Tertiary producing, effectively, the insect fauna of today. The post-Permian radiation occurred about 100 million years before a similar expansion of the flowering plants.

The President thanked Dr Archbold for a fascinating, provocative and wide-ranging talk.

Observations:

Ed Grey showed specimens of an ant-mimicking spider (*Habronestes* sp.) and described how they were seen ambushing Meat Ants. In the same colony of ants, individuals were seen engaged in ritualised fighting displays of front-leg boxing. [*Ettershank & Ettershank,* J. Aust Ent Soc., *1982, 21: 97-102 discuss the evolutionary significance of this display.* I.D.E.]

The meeting was closed at 09.33

MINUTES OF THE COUNCILLOR'S MEETING, 17 MARCH 2000

A formal Council meeting was not held as a quorum could not be obtained.

Present: P. Carwardine, D. Dobrosak, I Endersby, R. MacPherson.

Apologies: A. Kellehear, D. Stewart.

Correspondence:

- David Crosby: requesting termination of his Honary Life Membership.
- Hugh Bollam: letter of thanks to the Society for awarding him the Zoo Le Souëf Memorial Award.
- Department of Natural Resources and Environment: Letter advising that the Society's Research permit under the National Parks Act 1975 will be renewed.
- United Nation Association of Australia: Request to submit a nomination for World Environment Day 2000 awards.

Treasurer's Report: There was no report as the account books were still with the Auditor

Editor's Report: The Editor reported that there were sufficient papers in hand for the April issue but none for the June issue. More papers are urgently required.

General Business: The program for the remainder of the year was finalised:

April	Endersby	Insect Conservation
June	Kellehear	Them: Insects in Science Fiction
August	Dobrosak	Life History of Wattle Flower-Feeding Paropsine Beetles
October	Carwardine	Entomological films
December		Members' Night

NOTICE OF ANNUAL GENERAL MEETING

Members of the Society are advised that the Annual General Meeting will be held at the La Trobe University, Melbourne Campus, 215 Franklin Street, Melbourne, commencing at 8 p.m. on Friday 16 April 1999.

AGENDA

1. Approval of minutes of AGM held on 16 April 1999
2. Treasurer's Report
3. Editor's Report
4. Reports from Committees
5. Election of Council for 2000 - 2001
6 Expression of interest for joining Committees
7. General Business

Nominations for positions on the Council, in writing and signed by the proposer, seconder and nominee, must be in the hands of the President seven days prior to the Annual General Meeting. Nomination forms and Proxy forms may be obtained from the President. Nominations may also be accepted at the Annual General Meeting.

THE ENTOMOLOGICAL SOCIETY OF VICTORIA INC.
STATEMENT OF RECEIPTS AND PAYMENTS
FOR THE YEAR ENDED 31 DECEMBER 1999

GENERAL ACCOUNT

INCOME Subscriptions			
Member 1998		36	
1999		1527	
2000		376	
2001		20	1959
Institution 1999		150	
2000		84	234
Donations			9
			2202
EXPENDITURE			
Journal Costs			
Printing	840		
Postage	356		
Envelopes	220	1416	
Lecture Room Hire		180	
Corporate Affairs Fees		33	
Stationery & Postage		22	
Aust Ent Soc Sub.		55	
Government Taxes		8	1714
SURPLUS/(DEFICIT) FOR YEAR			488
Add Balance brought forward from 1998			4712
Balance carried forward to 2000			5200

LE SOUËF MEMORIAL FUND

INTEREST INCOME		
Treasury Corp. Victoria	126	
Commonwealth Bank Fixed Deposit	38	
Commonwealth Bank Savings Account	8	172
Less		
Award Expenditure	92	
Science Talent Search	50	
Bank Fees	4	
Government Taxes		146
SURPLUS/(DEFICIT) FOR YEAR		26
Add balance brought forward from 1998		1006
Balance carried forward to 2000		1032

STATEMENT OF ASSETS AT 31 DECEMBER 1999

GENERAL ACCOUNT

Bank Account	5200
Editor's Advance	104
Stock of Maps	40
	5344

LE SOUËF MEMORIAL FUND

Bank Account		1032
Fixed Deposit Stock		
Treasury Corporation of Victoria	1400	
Commonwealth Bank Fixed Deposit	1000	2400
		3432

Auditors Report:

I report that I have audited the 1999 accounts of the Entomological Society of Victoria, comprising the Statement of Receipts and Expenditure, the Statement of Assets, and the statements for the Le Souëf Memorial Fund.

The audit procedure examined the account books and records of the Society, including bank statements, bank books and cheque books.

In my opinion the accounts are properly drawn up and the financial records of the Society are in accordance with applicable accounting standards.

S.J. Cowling
16 march 2000

The Fossil History Of Insects - Evolution, Gaps In The Record And Extinctions With Comments On The Late Palaeozoic Insects Of Gondwana

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Insecta, the most diverse class of organisms on Earth at present, demonstrate an extensive fossil history and record (Jarzembowski & Ross, 1993). Much of the basic descriptive information has been published in a wide range of literature in the Russian, German and French languages as well as others. The preserved diversity of insects is greater than that of tetrapod vertebrates except for a 35 million year gap in the latest Devonian and Early Carboniferous (a time that coincides with widespread marine transgressions on all continents). Of the 30 commonly recognised extant orders all are recognised as fossils. Only the Lepidoptera show a marked decrease in diversity (50%) in the latest Tertiary than at present (Labendeira & Sepkoski, 1993), probably because of their lightly sclerotised bodies which are not readily preserved. Some 13 extinct orders of Insecta are also known with 8 becoming extinct at the end of the Permian and 3 surviving into the Triassic to eventually die out during that period. The only supraordinal taxon of the Insecta to die out (the Palaeodictyopteroidea) perished in the Götterdamerung scenario of the terminal Permian extinction event. Spectacular evolutionary radiation occurred throughout the Mesozoic and Tertiary coupled with the essential lack of extinctions at the familial Level after the Jurassic (Labandeira & Sepkoski, 1993); so much for the terminal Cretaceous extinction event and its effect on insects. Also of note is the apparent observation that the post-Permian insect radiation at the familial level occurred about 100 million years before the radiation of the angiosperms.

A brief geological history of the Insecta.

The earliest know hexapods are the collembolans (Parainsecta) from the earliest Devonian of Scotland (Martinez-Delclos, 1996). The same strata have also yielded the first Archaeognatha (*Rhyniognatha hirsti* Tillyard). Poorly known Archaeognatha are also known from the Lower Devonian of Quebec *and* the Middle Devonian of Gilboa, New York with other groups such as mites, scorpians, pseudoscorpians, centipedes, arthropleurids, amblypygids and spiders (Kukalova-Peck, 1991).

Extensive radiation of insects must have occurred in the Lower Carboniferous in order to account for the range of winged forms present from early in the Upper Carboniferous (including Ephemeroptera, Odonata, Palaeodictyoptera, Megasecoptera, Diaphanopterodea, Protorthoptera, Blattaria, Orthoptera, Homoptera, Miomoptera, Hypoperlida). The Odonata (Protodonata), Ephemeroptera and Palaeodictyoptera were huge with wing spans up to 71, 45 and 56 cm respectively; the large size possibly being related to increased levels of atmospheric Oxygen (up to 35% compared with the present 21% according to Graham et al. 1995). No Lower Carboniferous insects have, however, been described and Lower Carboniferous freshwater deposits are globally extremely rare. Some 50% of Late Carboniferous insects are characterised by the possession of sucking or semi-sucking mouth parts for imbibing juices and spores (a feature of about 10% of the modern fauna).

The Late Carboniferous insects evolved further during the Permian in response to global climatic changes and resultant changes in vegetation. Large forms continued to evolve (eg Engel, 1998) but Permian insects appear more familiar when compared with extant forms (Kukalova-Peck, 1991) and the first Diptera had appeared by the end of the period (Willman, 1989). Hemiptera apparently co-evolved with the *Glossopteris* flora of Gondwana (Anderson

et al., 1999). Sucking mouth parts continued to characterise many groups (Krassilov & Rasnitsyn, 1997).

Progressively during the Mesozoic Era the remaining 'Palaeozoic' insect orders died out (the Protodonata in the Triassic, Paraplecoptera, Glosselytrodea and Miomoptera in the Jurassic and the Protelytroptera in the Cretaceous). Many recent families arose in the Jurassic and the Cretaceous fauna was largely a modern fauna. The Cenozoic Era is essentially characterised by modern genera (Kukalova-Peck, 1991).

Late Palaeozoic Insecta of Gondwana.

A review of most Gondwana fossil insect faunas is provided by Schluter (1990) but new discoveries continue to be made (Anderson et al., 1999). The oldest Gondwanan insects are from the Namurian of South America (Argentina) and include well-preserved members of the Protodonata and Megasecoptera. Late Carboniferous (Stephanian) or earliest Permian members of the Palaeodictyoptera, Protorthoptera and the Paraplecoptera as well as the Blattodea (cockroaches) are also known from Argentina. Blattodea and Protorthoptera are also documented from Sao Paulo, Brazil. The only known Late Palaeozoic arachnids from Gondwana (*Gondwanarachne* and the remarkable giant *Megarachne*) are also from the Latest Carboniferous (Stephanian) or Earliest Permian of Argentina. Considerable debate exists over the precise age of these South American occurrences (Pinto, 1995).

Permian insects are known from a scatter of horizons across the Gondwanan continents. African records include an earliest Permian protorthopterid from the Dwyka Series of Zimbabwe and poorly dated early Permian? (associated with *Glossopteris*) Protorthoptera and Mecoptera from Madagascar. Collembola, Blattodea, Protorthoptera, Plecoptera (stoneflies), Hemiptera (bugs) and Coleoptera (beetles) have been described from the Middle Ecca near Pretoria. Late Permian records include Protorthoptera (Democratic Republic of the Congo) and Megasecoptera, Protorthoptera, Hemiptera, Mecoptera (scorpionflies) and Neuroptera (lacewings) from South Africa.

The Permian record from Antarctica is meagre with only Hemiptera and nymphs of possible Plecoptera or Protorthoptera. The South American Permian includes Mecoptera, Neuroptera, Hemiptera, Blattodea, Coleoptera and Odonata (dragonflies) with Odonata also known from the Falkland Islands. The Early Permian has yielded Blattodea, Hemiptera, Mecoptera and Coleoptera.

The Australian Permian includes an earliest Permian palaeodictyopteran from the Wynyard Tillite, Tasmania. A moderately diverse Changhsingian (Latest Permian) insect fauna including representatives of the Odonata, Plecoptera, Megaloptera, Psocoptera (psocids), Protolytroptera, Hemiptera, Mecoptera, Neuroptera, Glossolytrodea, Trichoptera (caddisflies), Coleoptera and ancestral Diptera (2-winged flies) is known from the Awaba Tuff Member of the Eleebana Formation, northern Sydney Basin.

Permian insect faunas of Gondwana possess a mixture of representatives of archaic orders, many of which became extinct at the end of the Permian, and orders of insects still extant.

Acknowledgements

The Interlibrary Loans staff of the Deakin University Library and Ian Endersby are thanked for their assistance in obtaining literature. Heather Ansell word-processed the manuscript.

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A Probable Australian *Cephrenes* Species in Singapore With Biological Notes on *C. Acalle* (Hesperiidae)

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Introduction

A second species of *Cephrenes* Waterhouse & Lyell, hitherto unknown from Sundaland, is recorded from Singapore. Based on circumstantial evidence it is speculated that a population has established, and that it is probably the Australian species *C. trichopepla* (Lower). The biogeography of *Cephrenes* is discussed, reasoning that the presence of *C. trichopepla* was by aided introduction rather than natural range expansion. In addition, details of the likely fourth instar larva and mature larval head of the Oriental species, *C. acalle niasicus* (Plotz) are given. Aspects of its biology are compared with Australian congeners with which it shows some common features.

Three Geographical Distributions for Australian Hesperiines

The Oriental and Australian Regions are separated by Weber's Line which marks the western boundary of the Sahul shelf (Corbet & Pendlebury 1992). Species which occur throughout both regions are termed Indo-Australian. The tropical hesperiine skippers which occur in mainland Australia are Indo-Australian, Oriental or Australasian [Australian Region] in origin. *Pseudoborbo bevani* (Moore) is an Oriental example; *Pelopidas agna* (Moore) and *Sabera dobboe* (Plotz) are Indo-Australian and Australasian ones, respectively.

Many Australasian butterflies occur extensively beyond continental Australia to include Maluku, New Guinea and associated islands, the Solomon Islands, Vanuatu or Fiji. Frequently, their distribution is centred on the island of New Guinea and, indeed, some extend into northern Australia only as an appendage to the overall distribution. For these, I prefer to use the term 'Australasian' as it helps distinguish them from the bassian hesperid fauna, which has a separate origin. The Australian Hesperiinae does not include this southern group. For Australian taxa, Common and Waterhouse (1981) compiled synoptic species and generic world distributions, and, from these, the likely origins of our fauna can be postulated, subject to their variably incomplete information.

An Australasian Origin for *Cephrenes*

The genus *Cephrenes* contains at least eight species (*fide* Parsons 1998) distributed over Southeast Asia to the Solomons and Australia (Common & Waterhouse 1981). Its greatest species diversity is in Papua New Guinea (Parsons 1998). This infers an Australasian origin for the genus with geologically recent evolution of *C. acalle*; this single extralimital species has spread throughout much of eastern Asia. In Southeast Asia, after speciating sometime before the Pleistocene glaciations, *C. acalle* probably expanded opportunistically throughout Sundaland in the absence of competitive congeners. Corbet and Pendlebury (1992) listed many oriental countries for this species; a broad distribution including the Philippine Islands and from China through to Sulawesi. Much of this region was, periodically, a single landmass joined to the Asiatic continent during the glaciations.

Possible Origins of the Two Australian Species

Cephrenes augiades (C. Felder) has an Australasian distribution occurring west to Sulawesi (Common & Waterhouse 1981). In an earlier geological period (Pleistocene?), it and other rainforest species extended into northern Australia via a land bridge joining Queensland to New Guinea. Preferring heavily shaded habitat (see Dunn 1995 for discussion) it failed to expand through the drier woodlands into the north west of the continent. The unique population in suburban Darwin, Northern Territory (specimens examined at ANIC), first appeared last decade (circa 1991) and is of another genetic origin. It seems to be this species, although, its genitalia has not been examined to confirm

this. It is my guess that this northern colony may have its origin in Indonesia as the orange markings in the male are more extensive than those in eastern Australia.

One of the exceptions to the classic Australasian pattern seems to be *Cephrenes trichopepla*. It occurs widely along the moist coastal and sub-coastal regions of the tropical and subtropical half of the continent and six islands in Torres Strait (Dunn & Dunn 1991), and yet is known from surprisingly few localities in Papua New Guinea (Parsons 1998). Unlike many other Australasian hesperiines, including *C. augiades*, it is not recorded west to Maluku. Hence, its distribution seems oddly restricted beyond Australia, and comparatively, over-expanded in the north west of the continent, particularly when compared with, for example, the common Indo-Australian species *Telicota colon* (Fabr.) (see Dunn & Dunn 1991). Moreover, the limited variation over its extensive range in Australia suggests an ancient 'founder effect' - colonised by a very small number of immigrants - its point of origin in or perhaps beyond Australia is unclear. Given its very limited distribution beyond Australia any populations discovered west of Weber's Line would have to be introduced or in some way human-assisted.

Observations of Juvenile *Cephrenes* in Singapore

During October 1999, a number of small, pale green larvae with dark heads was found in shelters on young, potted, bipinnate palms in the shaded streets of Chinatown, in Singapore. These closely resembled, in both size and appearance, second instar *Cephrenes* larvae, at which age the Australian species cannot be distinguished (Dunn 1993).

In the Central Business District, close to Fort Canning Park, a few larger larvae (figures 1 & 2) were found on a palmate palm (a *Raphis* sp.). Each facial, frontal lobe showed a band from vertex to gena, and an indistinct smoky brown pattern in the vicinity of the triangular plate (frontoclypeus). One of these larvae was male, determined by the pair of yellow glands visible through the abdominal cuticle (see Dunn 1993). Similar to the smaller versions found in Chinatown, their shelters were constructed by an offset, double-stitched method in the manner of *C. augiades* in Australia.

Although larvae of other hesperiines, such as *Telicota* Moore, utilise palms in Malaya (Corbet & Pendlebury 1992), these early stages, I believe, were *Cephrenes* based on circumstantial evidence and prior experience with both genera. They were visually estimated to be fourth instars based on head sizes for Australian congeners. At fourth instar, their head patterns differed markedly from both Australian species. In *C. augiades*, the head capsule is generally uniformly dark colored or jet black, and only very rarely paler with some preliminary patterns, whereas in *C. trichopepla*, a similar form to the mature larval facial design is present at fourth instar (Dunn 1995).

Soon after, near the old Fort Gate in Fort Canning Park, I examined several fan palms (*Licuala* sp.) and uncovered two large, dark, dead pupae. These, and their frond shelters, were heavily coated in white powder. A still-attached mature larval head capsule in one shelter possessed a dark-colored, smoothly curved band on each frontal lobe. Although this can be optically distorted in shed capsules (a live larva is preferred), the bands seemed a little more widely spaced from the lobe cleavage than in *C. augiades*. Otherwise, this head capsule appeared similar in pattern to the pale form, mature (fifth instar) head described by Dunn (1993). The anticipated basic design on the head capsule convinced me that these too were almost certainly *Cephrenes*.

I compared the shed mature (fifth instar) larval head capsule from the pupal shelter with those of the fourth instar larvae found on *Raphis*. Apart from its slightly larger size, the frontal bands were more sharply defined in the mature form. A similar trend of increased facial definition between fourth and fifth instars (but not sixth) is seen in *C. trichopepla*. In Singapore, it is unlikely that the Asian species would have an additional (sixth) instar as this is a winter adaptation seen in cooler latitudes such as in

southern Queensland (Dunn 1996). In both Australian species the sixth instar head is a larger replica of the fifth.

Corbet and Pendlebury (1992) listed only one species of *Cephrenes* in Malaya, viz. *C. acalle niasicus*. Their checklist also included Singapore in its local distribution. Hence, all were presumably this species, although none was bred to confirm this. Compared with the two Australian species, both sexes of adult *C. acalle* more closely resemble *C. augiades*, and the structure of the larval shelters and facies of the mature [but not fourth instar] larval head showed some similarities to this species, perhaps suggesting a close relationship. But, the very dark pupae [albeit, they were dead and perhaps discolored] and heavily powdered pupal shelter were more like those of *C. trichopepla*. All are generic characters, however; combinations of which would be expected in congeners.

Corbet and Pendlebury (1992) described the larva of *C. acalle* as, "Green, with a white head margined and marked with black," but the pupa was not detailed. Their description most probably pertained to a fifth instar (the mature larva). To supplement theirs, a description made from color video images (see also figures 1 & 2)), of a fourth instar, male, larva found on *Raphis*, is presented below:

> Larval body: pale green, with dorsal dark green stripe from near head to near tail. Two yellow gland-like (male) structures beneath cuticle beyond mid section towards rear. Head: pale cream with two brown bands; bands widely spaced, narrowed and black towards vertex, but became paler brown and broadened centrally in each lobe towards gena. Lobe band: mottled brown in lobe central area with conspicuous pale spot and pale specks close by within band; paler smudgy marks near antennal area and mandibles. Single narrow smoky brown stripe along cleavage lines between lobes, and two pale stripes along adfrontal sulcus near adfrontal area. Black band at back of head (near body attachment) from vertex to near antennae and mouthparts, but forked in area behind gena; finely connected with each frontal lobe band at vertex of head.

C. acalle is rare in the cultivated lowlands of Malaya (Corbet & Pendlebury 1992), perhaps because it was formerly a jungle inhabitant, and this may explain why I found little or no evidence of it in several Malaysian cities I visited such as Kuah, Georgetown, Kuala Lumpur, Melaka and Johore Bahru. Even in residential Singapore very few palms possessed larval shelters, let alone juveniles. This was quite unlike the situation in southern Queensland where few young palms examined had escaped oviposition.

Observations of an Adult *Cephrenes* in Singapore

My observations in Fort Canning Park, on 30 October 1999, at about 1330 hours were complicated by a bizarre discovery. Whilst examining more shelters where the two pupae were uncovered, I saw perched behind me on a *Licuala* fan palm, a single adult. My delight turned to confusion and then disbelief, as it seemed to be a female of *C. trichopepla*! Based on the distribution patterns discussed earlier this seemed implausible, as a true Australasian species was unlikely to be very farther west of Maluku unless human-assisted. And, for this species of comparatively limited distribution - most improbable!

Because it was raining, the adult was reluctant to fly, and was easily videoed at close range. Two frame-grabbed images of the live insect are presented (figures 3 & 4). After taking these images she was collected by hand, and immobilised by snap pinching the thorax. This allowed me to film both wing surfaces and ensure all characters were visible for later identification. Her sex was confirmed by examination of the abdomen, and by the more convex termen to the forewing, which gave a broader-wing appearance typical of females of this species.

As Corbet and Pendlebury (1992) did not illustrate an adult that matched the one encountered, it is presumably a new record for Singapore. In spite of a range of difficult *Telicota*-like skippers in Malaya (see plate 59 in their work) there are, in my judgement, no species which I could mistake for the large, pale, female of *C. trichopepla*. Both sexes have orange extensions along the forewing upper-side veins, with an extra, sharp point between veins CuA2 and 1A+2A. In general appearance the closest Malayan species they illustrated was the male of *Telicota colon*, also a woodland species, and one which occurs in Australia too. However, the male of this species has a sex brand, the female has reduced extensions along the veins, and both sexes lack the distinct large tornal spot on the hind-wing, beneath, present in *C. trichopepla*. *T. colon* is also a much smaller skipper and the adult encountered was too large to be this.

Upon return home, the single-frame images were meticulously compared with Australian material. The under-wing surfaces were the correct colors including a slight greenish tone [detected in the color video]. The large tornal spot on the hind-wing beneath was present on the anal fold (but is hidden by the anal fold in the live photo presented: see figures 3 & 4), and the forewing upper-side showed the same orange extensions along the veins. No points of difference were detected on either wing surfaces, between this Singaporean adult and Australian *C. trichopepla* females in my collection. Hence, it was almost certainly *C. trichopepla*, unless it was an undescribed sibling species; all other *Cephrenes* taxa illustrated by Parsons (1998) are darker insects (typifying rainforest dwellers) and closer in coloring to *C. augiades* or *C. acalle*.

Only the one adult was seen and, despite a renewed search no juvenile *C. trichopepla* were found as evidence of a population. However, given the ideal climate and the fresh condition of the female (undoubtedly having bred locally), it is probably established in Singapore. As larvae have been recorded feeding on more than 70 species of palms grown in Australia (Dunn 1996), and since there are plenty of potential hosts in Singapore, this would seem a reasonable assumption.

In Australia, the aggressive males of *C. trichopepla* establish territories near larval hosts and foraging sites, and are fearless and site tenacious insects (Dunn 1994). If not already widespread in Singapore, it is soon likely to become so, and may also invade the neighbouring lowlands of the Malay Peninsula. On the peninsula, human habitations and agricultural changes, especially the extensive palm oil plantations, are perhaps less suited to the native forest-dwelling species, *C. acalle*, and are inadvertently modified in favour of *C. trichopepla* which prefers open habitat.

Acknowledgements

I thank Andrew Atkins (University of Newcastle) for his comments on the first draft, and for providing a list of references for this genus. He suggested improvements to my argument, and pointed out other possibilities too, which I had not discussed. Peter Williams (Natural Resources and Environment) also provided helpful comments.

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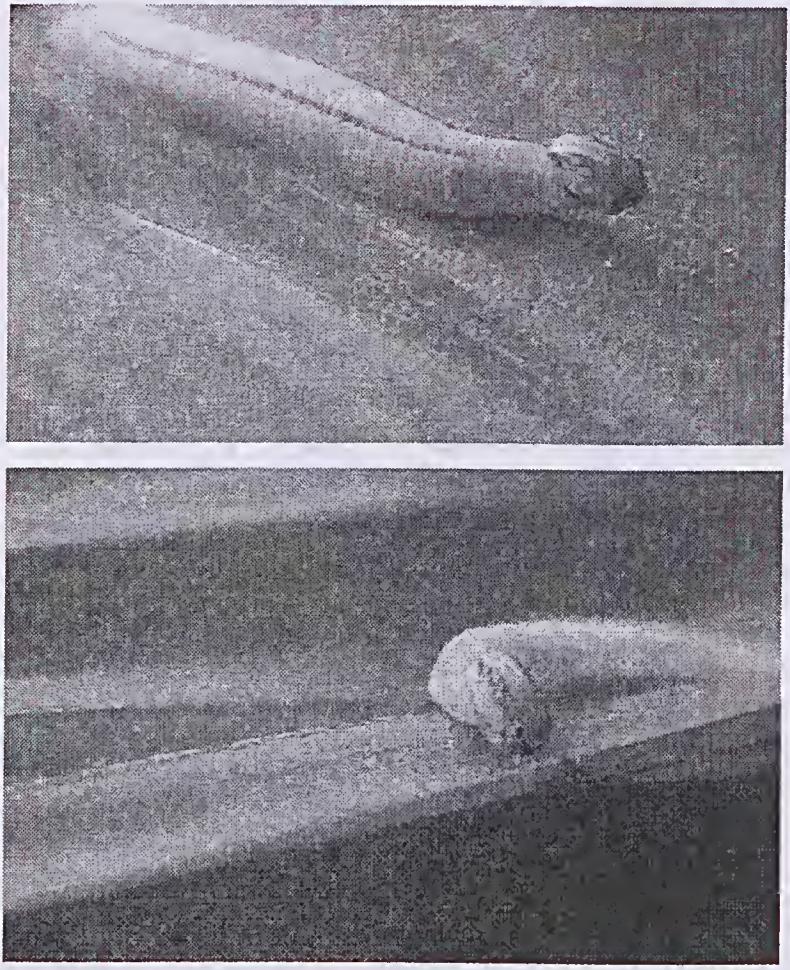
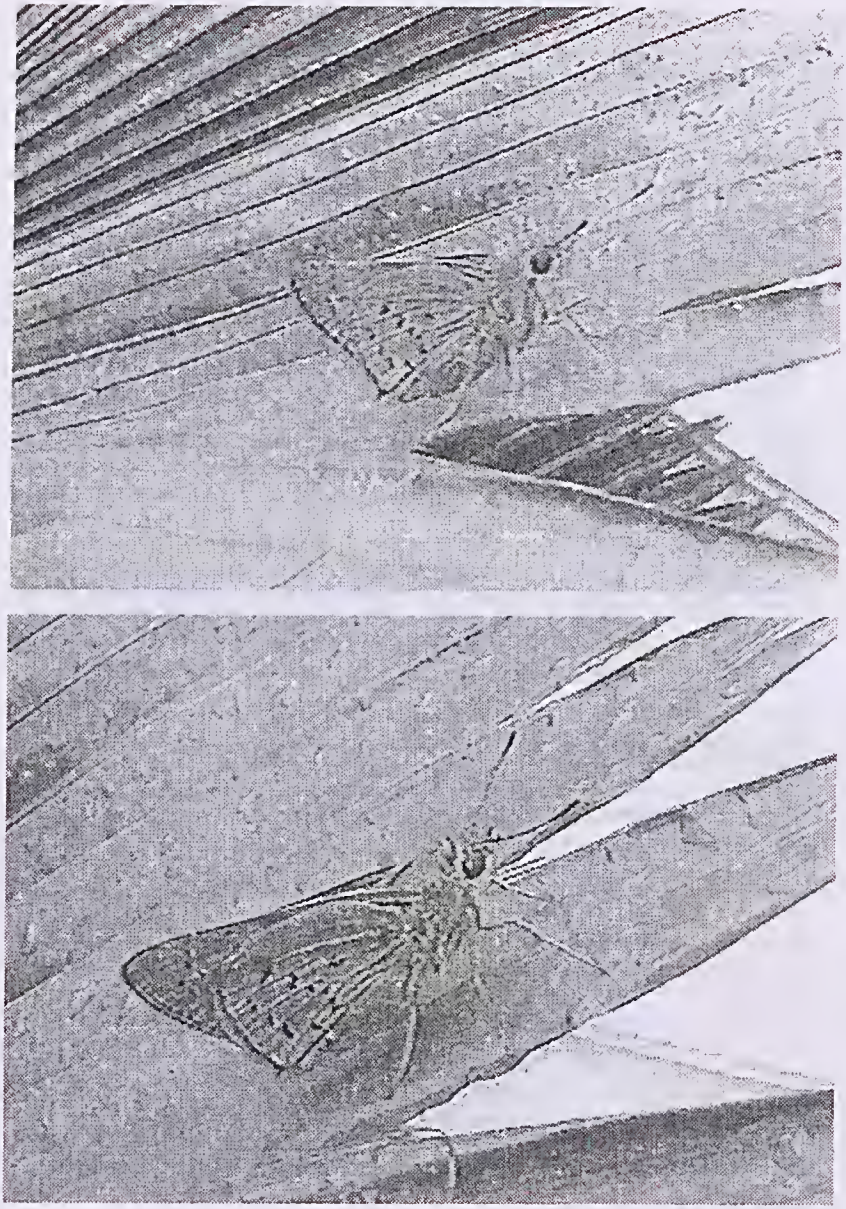


Figures 1 & 2
Fourth instar larvae found on *Raphis* palms in Singapore CBD - almost certainly those of *Cephrenes acalle*.



Figures 3 & 4
The live female of *Cephrenes trichopepla* settled on a *Licuala* fan palm near the old Canning Fort Gate, Singapore in October 1999.

RECENT ARTICLES OF INTEREST

Compiled by Ian Faithfull

Beetle war is on, P.Sellars, *Weekly Times* 20 Jan. 1999 p.17. *Carpophilus* beetles (Nitidulidae) are a resurgent pest in stone fruit in the Goulburn Valley with crops losses of up to 50%. Use of pheromones, rather than insecticides to control oriental fruit moth, *Cydia molesta*, is believed to be to blame. However artificial beetle pheromones are being used to attract adult to trays of fruit where they are killed by insecticide.

Alarm out on thrip spread, M. Rose, *Weekly Times* 17 Mar. 1999 p.9; **Seminars to halt thrip**, *WT* 30 June p.15; **Thrip hits vegies**, Paul Sellars, *WT* 1 Dec., p.7. Western flower thrips, first found in greenhouses in Victoria in 1996, detected for the first time on crops in the open in Victoria - strawberries in the Yarra Valley. The thrip can consume plant material weighing up to 12.5% of its body weight per hour. It reduces fruit and flower quality and can carry damaging plant viruses. Difficult to control, so integrated management courses have been devised by the Institute for Horticultural Development. The first major infestations in Victorian vegetable crops in November are linked with outbreaks of tomato spotted wilt virus, which the thrips transmits.

Mite bid to attack gorse, B.Clancy, *Weekly Times* 10 Mar. 1999 p.4; **Mighty mite at war with weed**, B.Mitchell, *The Age* 7 Apr. p.A7; **Gorse faces battle on two fronts**, *Bendigo Advertiser* 7 Apr. p. 37. Keith Turnbull Research Institute of the Department of Natural Resources and Environment makes the first releases of the gorse spider mite, *Tetranychus lintearius*, in Victoria - a biological control agent for the prickly shrub *Ulex europaeus*. The mite lives in communal webs on the branches.

Ants new weapon to combat weeds, *Wangaratta Chronicle* 17 May 1999 p.9; **Find is ants pants**, M.Jackson, *Weekly Times* 2 June 1999 p.14. Research by Agriculture Victoria at Rutherglen shows that unspecified ants remove a significant amount of weed seed from the ground surface, particularly wild radish, but excavations of nests failed to discover the seed and it is unclear whether the ants consume it. Ants like wild radish seeds but these can take years to detach from their pods.

Monarchs under siege - Will a threat facing a favourite butterfly trigger gene crop fears in the US? K.Kleiner, *New Scientist* 162(2187) p.4, 22 May 1999. In laboratory experiments, larvae of *Danaus plexippus* were fed on milkweed sprinkled with pollen from maize into which genes of *Bacillus thuringiensis* have been engineered as a pest control strategy. Half the larvae died within four days. Proponents of genetically engineered crops argue that such effects have little relevance in the field. However milkweed growing near maize crops has been observed to be covered with maize pollen.

Spiders take to the sky, *Wangaratta Chronicle* 4 June 1999. Extensive dense gossamer produced by ballooning juvenile spiders.

Caterpillars feast on lupins. Kim Woods, *Weekly Times* 20 Oct. 1999 p.33. Outbreaks of heliothis through much of the Riverina, aerially sprayed.

Killer bait for blow-ins. *Weekly Times* 15 Sept. 1999 p.96. The Lucitrap system for sheep blowfly control uses baits that smell like fleece rot. Flies enter the traps and cannot escape. If enough traps are used (1 per 200 sheep recommended) whole flocks no longer need to be jetted to protect them, and affected sheep can be treated individually.

Mothballs for blowfly study. John Parry, *Weekly Times* 24 Nov. 1999 p.74. Attempts to develop a vaccine against blowfly strike discontinued.

Lice take a licking. *Weekly Times* 1 Dec. 1999 p.3. Sheep lice are spread by contact between clean and infested sheep but also by contact with shearers' clothing and footwear and can live for up to 4 weeks in shearers' mocassins. Up to 225 lice fell from a single sheep on to such footwear. One solution is to put the moccasins in the microwave for five minutes.

Sterile fruit flies for pest control, Fiona Myers, *Weekly Times* 20 Oct. 1999 p.30; **Battle plans on the fly,** *WT* 10 Nov. p.31; **NSW fruit fly setback,** *WT* 24 Nov. p.74; **Third Riverina fruit fly outbreak,** Paul Sellars, *WT* 8 Dec. p.28; **New fruit fly fear,** Paul Sellars, *WT* 12 Jan. 2000 p.2; **NSW district loses fruit fly-free status,** *WT* 19 Jan. p.13. Fruitflies continue to traumatise growers in the Murrumbidgee, Murray, Goulburn, Sunraysia and Riverland irrigation areas. Whenever flies are detected in traps, trade restrictions are imposed for crops within a 15 km or 80 km radius and costly fruit sterilisation treatments are required. 3 million sterile *Dacus tyroni* were released at Griffith in October as part of a revamped NSW Agriculture strategy for the citrus industry involving baiting in buffer zones and sterile releases in core citrus-growing areas. Random road blocks with searches are again being imposed at the borders of the Fruit Fly Exclusion Zone. The third detection in the Riverina was made in early December. Others occurred at Cobram and Yarrawonga in January and baiting teams set to work immediately. Three outbreaks were also reported in South Australia and further new detections in NSW meant that by 19 January the whole Murrumbidgee Irrigation Area had lost its fruit-fly-free status.

Readers are invited to forward items suitable for inclusion in "Recent Articles of Interest" to the compiler at 2 Jacana Drive, Carrum Downs, Vic. 3201.

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CONTENTS

	Page
Minutes of Annual General Meeting, 18 February 2000	17
Minutes of the Councillor's Meeting, 17 March 2000	18
Entomological Society of Victoria Inc. Statement of Receipts and Payments for the year ended 31 December 1999	19
Entomological Society of Victoria Inc. Statement of Assets at 31 December 1999	20
Archbold, N.W. The Fossil History of Insects - Evolution, Gaps in the Record and Extinctions with Comments on the Late Palaeozoic Insects of Gondwana	21
Dunn, K.L. A Probable Australian *Cephrenes* Species in Singapore with Biological Notes on *C. Acalle* (Hesperiidae)	24
Recent Articles of Interest. Compiled by Ian Faithfull.	30

DIARY OF COMING EVENTS

Friday 14 April Annual General Meeting
Ian Endersby will present a talk on
"Insect Conservation"

Friday 19 May Council Meeting

Friday 18 June General Meeting
Presidential Address: Allan Kellehear will present a talk on
"Them: Insects in Science Fiction"

At the Society's meeting room at La Trobe University, 2nd Floor, Room 2.29, 215 Franklin Street, Melbourne (Opposite the Queen Victoria Market near Queen Street)
Melway reference Map 2F B1

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